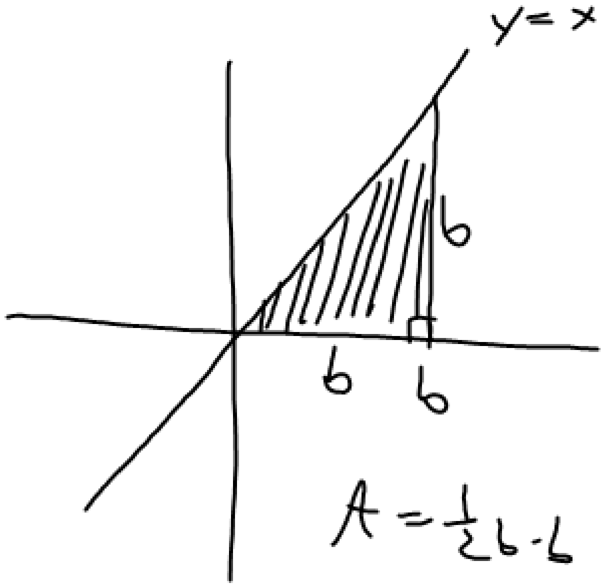
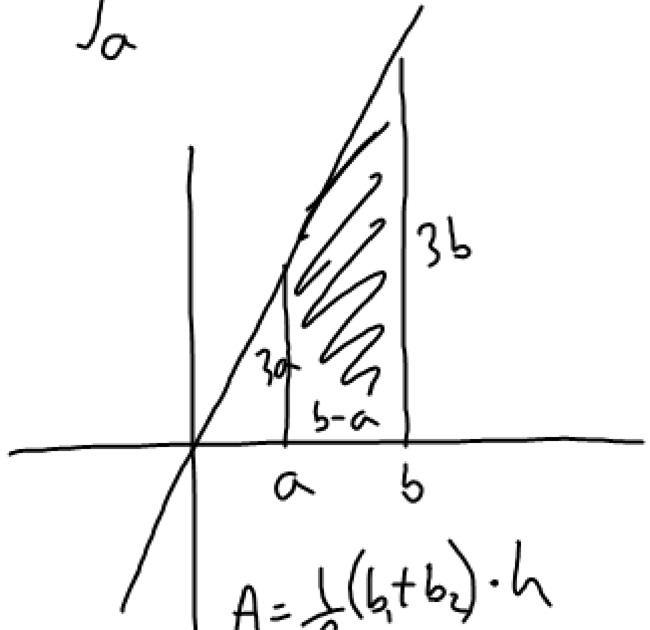
Do Quick Review 5.2

(23) $\int_0^b x\,dx = \text{Area} = \frac{1}{2}b^2$



$A = \frac{1}{2} b \cdot b = \frac{1}{2} b^2$

(26) $\int_a^b 3t\,dt$



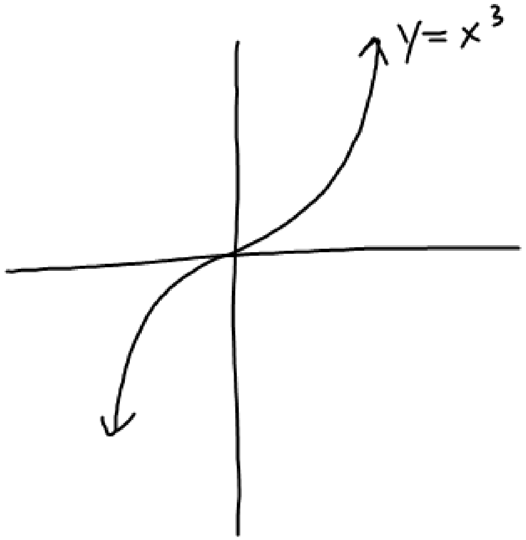
$A = \frac{1}{2}(b_1 + b_2) \cdot h$

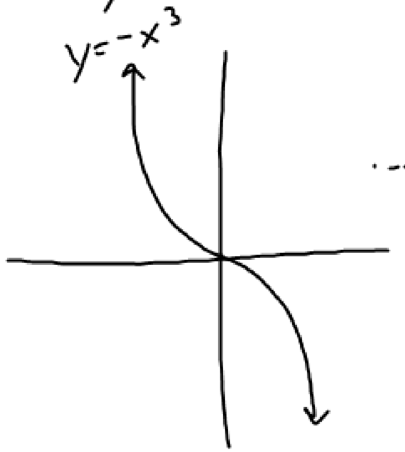
$A = \frac{1}{2}(3a + 3b) \cdot (b - a)$

$A = \frac{3}{2}(a + b)(b - a)$

$= \frac{3}{2}(b^2 - a^2)$

Do 5.2 #39, 40, 47-56
(No Calc)





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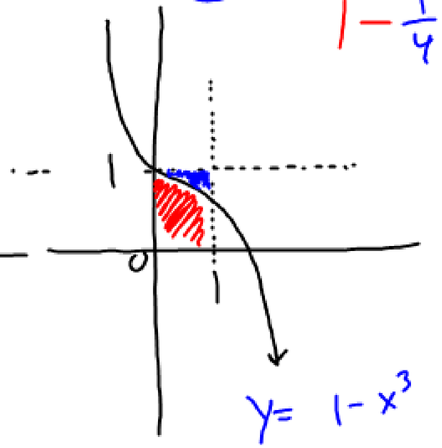
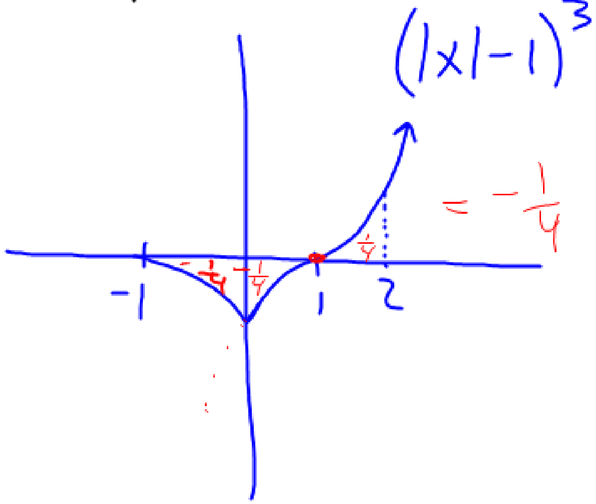
$1 - \frac{1}{4} = \frac{3}{4}$





$= -\frac{1}{4}$

1. *Order of Integration:* $\int_b^a f(x)\,dx = -\int_a^b f(x)\,dx$ A definition

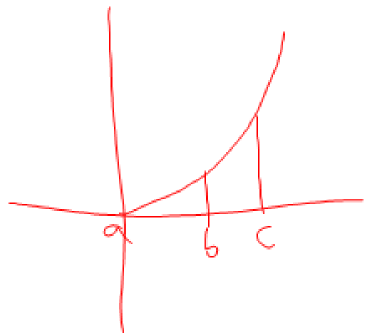
2. *Zero:* $\int_a^a f(x)\,dx = 0$ Also a definition

3. *Constant Multiple:* $\int_a^b kf(x)\,dx = k\int_a^b f(x)\,dx$ Any number k

3[rect., rect. rect. ...] $\int_a^b -f(x)\,dx = -\int_a^b f(x)\,dx$ $k = -1$

4. *Sum and Difference:* $\int_a^b (f(x) \pm g(x))\,dx = \int_a^b f(x)\,dx \pm \int_a^b g(x)\,dx$

5. *Additivity:* $\int_a^b f(x)\,dx + \int_b^c f(x)\,dx = \int_a^c f(x)\,dx$



2. Suppose that f and h are continuous functions and that

$$\int_1^9 f(x)\,dx = -1, \quad \int_7^9 f(x)\,dx = 5, \quad \int_7^9 h(x)\,dx = 4.$$

Use the rules in Table 5.3 to find each integral.

(a) $\displaystyle\int_1^9 -2f(x)\,dx$

(b) $\displaystyle\int_7^9 [f(x) + h(x)]\,dx$

(c) $\displaystyle\int_7^9 [2f(x) - 3h(x)]\,dx$

(d) $\displaystyle\int_9^1 f(x)\,dx$

(e) $\displaystyle\int_1^7 f(x)\,dx$

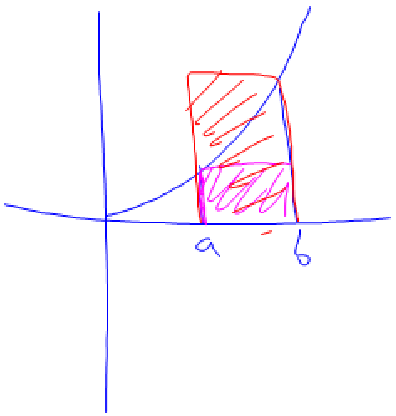
(f) $\displaystyle\int_9^7 [h(x) - f(x)]\,dx$

6. *Max-Min Inequality:* If $\max f$ and $\min f$ are the maximum and minimum values of f on $[a, b]$, then

$$\min f \cdot (b - a) \leq \int_a^b f(x)\,dx \leq \max f \cdot (b - a).$$

7. *Domination:* $f(x) \geq g(x)$ on $[a, b] \Rightarrow \int_a^b f(x)\,dx \geq \int_a^b g(x)\,dx$

$$f(x) \geq 0 \text{ on } [a, b] \Rightarrow \int_a^b f(x)\,dx \geq 0 \qquad g = 0$$



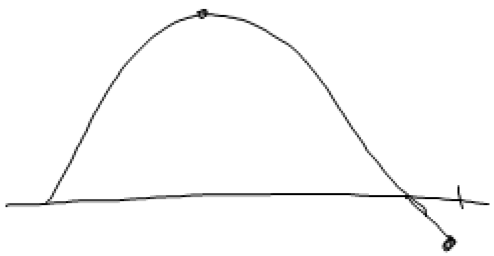
$$\int_0^1 \sqrt{1+\cos x}\,dx < 3/2$$

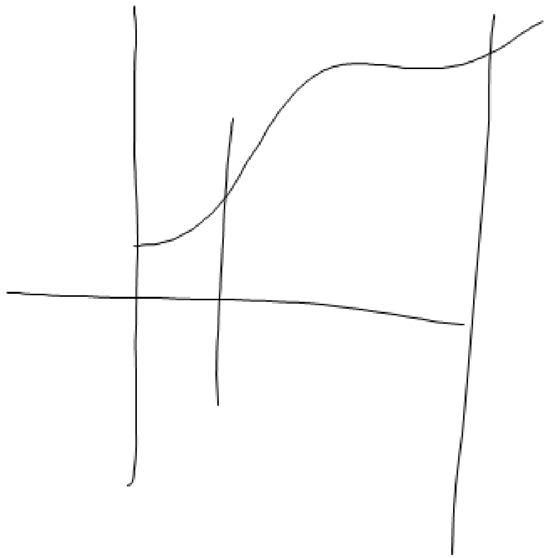
1

$$\int_0^1 \sqrt{2}\,dx \approx 1.4 < 1.5$$

$$\int_0^2 \sqrt{1+x}$$

$$\int_1^3 \frac{5}{x}$$





$$\frac{f(c_1)+f(c_2)+f(c_3)\cdots f(c_n)}{n}$$

$$\frac{1}{n}\sum_{k=1}^{n} f(c_k)$$

$$\frac{\Delta x}{b-a}\sum_{k=1}^{n} f(c_k)$$

$$\frac{1}{b-a}\sum_{k=1}^{n} f(c_k)\Delta x$$

$$\boxed{av(f) = \frac{1}{b-a}\int_a^b f(x)\,dx}$$

Read 5.3

Sect. 5.3

\# 1–6 (3), 7, 8, 11–14 (2), 15 or 16, 17 or 18